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MITIGATING THE IMPACT OF COVID-19 ON THE FOOD INDUSTRY: LESSONS LEARNED AND FUTURE DIRECTIONS

Norrina Din[1*], Noorliza Zainol[2], Noorsa Riza Johari[3], Mohamad Azli Razali[4], Nurul Imtiaz Abd Gani[5]

[1] Faculty of Hotel and Tourism Management, Universiti Teknologi MARA Cawangan Pulau Pinang Kampus Permatang Pauh, Malaysia.
Email: norrina.din@uitm.edu.my
[2] Faculty of Hotel and Tourism Management, Universiti Teknologi MARA Cawangan Pulau Pinang Kampus Permatang Pauh, Malaysia.
Email: noorliza690@uitm.edu.my
[3] Faculty of Hotel and Tourism Management, Universiti Teknologi MARA Cawangan Pulau Pinang Kampus Permatang Pauh, Malaysia.
Email: noorsariza829@uitm.edu.my
[4] Faculty of Hotel and Tourism Management, Universiti Teknologi MARA Cawangan Pulau Pinang Kampus Permatang Pauh, Malaysia.
Email: mohamad080@uitm.edu.my
[5] Universiti Utara Malaysia, Sintok, Kedah, Malaysia
Email: nurulimtiaz@uum.edu.my
[*] Corresponding Author

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Abstract:

The COVID-19 pandemic has affected the global economy and daily life, with the food industry being particularly impacted. The potential transmission of the virus through the food supply chain, including production, processing, distribution, retail, and delivery personnel, raises concerns. Thus, there is an urgent need for a Food Safety Management System that incorporates good hygiene, sanitation, and worker fitness. This proposed conceptual paper aims to scrutinise the knowledge, risk perception and preventive actions among food workers, including food riders, during the COVID-19 pandemic. This study also aims to support the development of a more comprehensive approach to food safety management systems to mitigate the impact of COVID-19 on the food industry. Policymakers could use this data to develop policies to improve preventive measures and guidelines for food service operators, both now and in the future.

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COVID-19, Preventive Action, Food Safety, Food Industry, Food Workers and Food Rider

Introduction

The World Health Organisation (WHO) has identified crowd avoidance as one of the primary methods for preventing the spread of infectious diseases such as COVID-19, Influenza Infections, Severe Acute Respiratory Syndrome (SARS), and others. The majority of businesses, schools, higher education institutions, transportations, and hospitality and tourism businesses are closed during the COVID-19 pandemic (Gupta et al., 2022; Paul et al., 2023). WHO has emphasised the possibility of COVID-19 transmission throughout the various stages of the food supply chain, including production, processing, distribution, retail, and delivery personnel, despite the lack of evidence that the virus can be transmitted through food. However, due to the importance of the economy and the slight decrease in the number of cases, businesses providing essential services like food services have opened. Accordingly, it is imperative to implement a Food Safety Management System that prioritises the health, cleanliness, and fitness of the food industry's workforce, including measures such as good hygiene and sanitation practices. The Malaysian Ministry of Health (MOH) urges food workers, including food delivery riders, to get screened for COVID-19 because they might be contagious, infected, or able to spread it to customers at that time. Thus, this conceptual paper explores the origins of COVID-19, food safety knowledge, risk perceptions and preventive measures in dealing with the situation. This study also supports a more comprehensive food safety management system to mitigate the effects of COVID-19 on the food industry. The results could be utilised by policymakers to enhance current and future preventative measures and guidelines for food service operators. The development of this conceptual paper was based on a review of pertinent journal articles, conference proceedings, books, and online news articles.

Literature Review

The Origin of The COVID-19

The origin of COVID-19 was identified for the first time in December 2019, with 27 unidentified pneumonia cases in Wuhan City, Hubei Province, China (Lu, Stratton, and Tang, 2020; Sohrabi et al., 2020). These cases were associated with the Huanan Seafood Wholesale Market in Wuhan, which sold a variety of live animals, including poultry, fish, snakes, marmots, snakes, and bats. The Chinese Centre for Disease Control and Prevention (CCDC) identified it as unknown pneumonia caused by Beta coronaviruses (β-CoVs or Beta-CoVs) on January 7, 2020. Since then, it has been known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), according to Sohrabi et al. (2020). On 11 March 2020, Dr Tedros Adhanom Ghebreyeusus, the Director General of the World Health Organisation (WHO, 2020a), announced that the name had been changed to coronavirus disease 2019 or COVID-19. Due to its rapid spread across a sizable population, regions, nations, and continents, it has been deemed a pandemic (WHO, 2020a; Sohrabi et al., 2020). From 10 to 26 January 2020, there were 23 Patient Under Investigation (PUI) cases in Malaysia, of which 14 were Malaysian, eight were from China, and one was from Jordan (MOH, 2020). The first case was identified on January 25, 2020, involving a 40-year-old man from Johor who had travelled from Wuhan (Pharmaceutical Technology, 2020).

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The Symptoms

Although some individuals exhibit no symptoms of COVID-19, common symptoms include fever, sore throat, dry cough, fatigue, appetite loss, loss of smell, and muscle aches. Some individuals may develop severe complications, such as Acute Respiratory Distress Syndrome (ARDS), organ failure, and shortness of breath, which is often a sign of severe pneumonia (Chen et al., 2020). The symptoms of this virus can infect people of all ages, from infants to older people. However, the elderly who are over the age of 60 and have other chronic diseases such as cancer, cardiovascular disease, and chronic respiratory disease are more susceptible to the virus, which may result in death (Chen et al., 2020).

The Potential Infectious of COVID-19 Among Food Workers and Consumers

There were 12 964 809 cases of COVID-19 infection and 570 288 deaths worldwide as of July 14, 2020. The United States has the highest reported cases, with 3,286,063 confirmed cases and 134,704 deaths (WHO, 2020b). As of 14 July 2020, 8,725 cases and 122 deaths had been reported in Malaysia (WHO, 2020b). Since the virus is easily transmitted from one person to another, Chen et al. (2020) discovered that most travellers have unknowingly spread this virus to other countries. Countries like Taiwan, Vietnam, Korea, Thailand, Japan, the USA, Australia, Italy, France, and even Malaysia are clear examples. WHO also reported that 17,481 confirmed cases of COVID-19 outbreak were outside of China. Due to that, the Malaysian Ministry of Health (MOH) has instructed travellers from China, Korea, and Turkey, as well as those entering the country by land, air, or sea, to self-quarantine for 14 days (MOH, 2020). In fact, most nations follow the same procedures.

In addition, a cruise ship was also impacted by this unprecedented pandemic. One of the cases involves a Diamond Princess Cruise ship anchored in the Japanese port city of Yokohama. The Diamond Princess cruise had 696 laboratory-confirmed cases (Sawano, Ozaki, Rodriguez-Morales, Tanimoto, & Sah, 2020). Two Malaysians tested positive on that cruise ship (Pharmaceutical Technology, 2020). From February 5, 2020, until February 19, 2020, the Japanese government quarantined 3,711 passengers and cruise staff, including food handlers (Sawano et al., 2020). As of 15 February 2020, 36 food handlers' cases were discovered in Singapore. These cases were spread through direct and indirect contact, including via fomite-mediated transmission and food sharing. There have been incidents of a similar nature in other countries. To prevent the spread of disease, the World Health Organisation (WHO) has stressed the importance of strict hygiene and sanitation, particularly in the food service industry (Pung et al., 2020; WHO, 2020c).

Information about infected food service employees is presented in Table 1. Specific factors increase the risk of exposure to the virus, among workers in the meat and poultry processing industries. Long periods of close proximity to co-workers (within 6 feet for 15 minutes) over the course of 8–12-hour shifts, shared workspaces, communal transportation to and from work, shared housing, and regular contact with other workers in the community all contribute to this. Many of these may also contribute to the virus's ongoing spread throughout the community (Waltenburg et al., 2020). However, there is still a dearth of data coming from Asia that pertains specifically to Malaysia that require further investigation.

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TABLE 1. Laboratory-confirmed COVID-19 cases among workers in meat and poultry facilities — 23 states, April–May 2020*

State	Type of meat/poultry in affected facilities	No. (%)			
		Facilities affected	Workers in affected facilities†	Confirmed COVID-19 cases among workers	COVID-19–related deaths§
Arizona	Beef	1	1,750	162 (9.3)	0 (0)
Colorado	Beef, bison, lamb, poultry	7	7,711	422 (5.5)	9 (2.1)
Georgia	Poultry	14	16,500	509 (3.1)	1 (0.2)
Idaho	Beef	2	797	72 (9.0)	0 (0)
Illinois	Beef, pork, poultry	26	N/A	1,029 (—)	10 (1.0)
Kansas	Beef, pork, poultry	10	N/A	2,670 (—)	8 (0.3)
Kentucky	Pork, poultry	7	7,633	559 (7.3)	4 (0.7)
Maine	Poultry	1	411	50 (12.2)	1 (2.0)
Maryland	Poultry	2	2,036	208 (10.2)	5 (2.4)
Massachusetts	Poultry, other	33	N/A	263 (—)	0 (0)
Missouri	Beef, pork, poultry	9	8,469	745 (8.8)	2 (0.3)
Nebraska	Beef, pork, poultry	23	26,134	3,438 (13.2)	14 (0.4)
New Mexico	Beef, pork, poultry	2	550	24 (4.4)	0 (0)
Pennsylvania	Beef, pork, poultry, other	30	15,548	1,169 (7.5)	8 (0.7)
Rhode Island	Beef, pork, poultry, other	6	N/A	78 (—)	0 (0)
South Carolina	Beef, pork, poultry, other	16	N/A	97 (—)	0 (0)
South Dakota	Beef, pork, poultry	4	6,500	1,593 (24.5)	3 (0.2)
Tennessee	Pork, poultry, other	7	N/A	640 (—)	2 (0.3)
Utah	Beef, pork, poultry	4	N/A	67 (—)	1 (1.5)
Virginia	Pork, poultry, other	14	N/A	1,109 (—)	10 (0.9)
Washington	Beef, poultry	7	4,452	468 (10.5)	4 (0.9)
Wisconsin	Beef, pork, veal	14	14,125	860 (6.1)	4 (0.5)
Wyoming	Beef	0	N/A	1 (—)	0 (0)
Total¶	**Beef, bison, lamb, pork, poultry, veal, other**	**239**	**112,616**	**16,233**	**86**
Combined total**	**—**	**264**	**—**	**17,358**	**91**

Abbreviations: COVID-19 = coronavirus disease 2019; N/A = not available.
* Data reported through May 31, 2020. Five states that responded to the data request did not report any laboratory-confirmed COVID-19 cases among workers in the animal slaughtering and processing industry; 22 states with animal slaughtering and processing facilities did not respond to the data request. The 13 states that contributed to both an earlier assessment and this update provided any updates to previously reported data, in addition to reporting new cases and facilities, through May 31, 2020.
† Among 14 of 23 states reporting the number of workers in affected workplaces, 9.1% of workers received diagnoses of COVID-19.
§ Percentage of deaths among cases.
¶ Data on workers with COVID-19 from 23 states that submitted data to this report.
** Combining data on workers with COVID-19 (1,125), COVID-19–related deaths (five), and COVID-19–affected facilities (25) through April 27 from six states that contributed to an earlier assessment of COVID-19 among meat and poultry processing workers that did not submit updated data to this report (https://www.cdc.gov/mmwr/volumes/69/wr/mm6918e3.htm?s_cid=mm6918e3_w).

Note: Adapted from Morbidity and Mortality Weekly Report by Waltenburg et al., 2020 p.889.

Risk Perceptions

The hospitality industry must highlight several distinct types of risks (Fuchs & Reichel, 2006). One of these risks is equipment risk, which can refer to equipment or organisation issues. In contrast, regarding physical and health risks, issues such as food safety, epidemics, accidents, etc., are included. An individual's risk perceptions reflect their estimation of the frequency of negative events and the severity of the outcomes they predict. Taylor's (1974) theory of perceived risk asserts that individuals make decisions based on the level of risk they perceive to be associated with the possibility of unfavourable outcomes resulting from their choices. According to a number of studies, the risk perception of COVID-19 among food workers is influenced by various factors, including their job role, age, gender (Rodriguez-Besteiro et al., 2021), and level of education (Elhadi et al., 2020).

Knowledge

As with the concepts of truth, belief, and wisdom, there is no scholarly consensus on a single definition of knowledge; instead, numerous theories regarding its nature exist. Knowledge is defined by Davenport and Prusak (1998) as

….. a fluid mix of frame experience, significant value, contextual information, and expert insight that provides a framework for evaluating and incorporating new experience and information.

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In general, there are several types of knowledge (Abernathy, Dunlop, Hammond, and Weil, 1999). DeLong and Fahey (2000) developed a useful framework to classify knowledge that distinguished between human, social, and structured knowledge. Human knowledge consists of what humans know or can do. For instance, this can be determined by the individual's previous dining experiences. Meanwhile, social knowledge is typically acquired through interpersonal relationships. The interactions between consumers on many levels are an illustration of social knowledge. And structured knowledge is typically explicit knowledge and is rooted in an organisation's system, processes, rules, and routines. Regarding the experience of knowing something, human knowledge is deemed the most applicable of these three categories of knowledge in this study. In other words, knowledge is the self-assured comprehension of a subject, with the potential to apply it for a particular purpose. As a result, knowledge in this study pertains to food workers (delivery, restaurant, and home-based food operators) and food riders' understanding of hygiene, sanitation, safety, and COVID-19 awareness. This group was specifically targeted due to their historical lack of knowledge on the topic. This population is vitally important during the pandemic because they play pivotal roles in the food industry.

Yang et al. (2021) found that gender and occupation were the most critical factors influencing residents' knowledge of COVID-19, while occupation, family income, and knowledge were the most influential factors in determining attitudes. The essential elements impacting residents' COVID-19 preventive practises were location, employment, whether they were chronically ill, knowledge, and attitude. Knowledge acquisition is a significant factor that promotes the adoption of healthful practices and behaviours. Due to this, having knowledge based on clear and objective information would enable them to comprehend and implement rapid responses in the event of a pandemic (Rincón Uribe et al., 2021). The high level of knowledge about COVID-19 among Saudi citizens translates to safe and effective practises during a COVID-19 pandemic, indicating that they should exercise utmost caution (Shin et al., 2023).

Preventive Measures/Actions

"Contactless" delivery service is one of the preventative measures implemented by China in the food industry during the COVID-19 pandemic. To ensure the safety of workers and customers, McDonald's Corp, Starbucks Corp, and other fast-food companies apply these enhanced preventive measures to all their service channels (Mark, 2020). Even if person-to-person contact is eliminated, the Covid-19 virus can survive on surfaces or objects for several hours or days (Mark, 2020; WHO, 2020c). According to the Harvard Medical School, takeaway and delivery are not worth it because the virus can survive for several hours or days (Mark, 2020; WHO, 2020c).

During the Movement Control Order (MCO) in Malaysia, the government ordered the closure of food premises for the public to dine in (Azlan, Hamzah, Sern, Ayub, and Mohamad, 2020). The Standard Operating Procedure (SOP) must be followed at all times, even though the food service industry is permitted to serve dine-in customers during the Conditional Movement Control Order (CMCO) and the Recovery Movement Control Order (RMCO) (MOH, 2020c; Shah et al., 2020). Consumers are still encouraged to get the food either by taking it away with them or by having it delivered to their homes. There are numerous food delivery services, including UberEATS, Deliveroo, Foodpanda, etc. Retailers like Tesco, Mydin, and AEON Big are also open so that consumers can do their weekly grocery shopping from the comfort of their own homes. In addition to supplying food to consumers, these businesses are increasing their

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operations via alternate means, such as pick-up services (Shahidi, 2020). This alternative method allows consumers to order groceries online and pick them up at a convenient time.

As a preventative measure, Standard Operation Procedures (SOP) such as body temperature monitoring, social distancing, a limited number of consumers at once, wearing masks (Gupta et al., 2022), frequent hand washing, sanitising specific areas, and cashless transactions was implemented during transactions (WHO, 2020c). A significant percentage of waiters are knowledgeable of the typical symptoms of COVID-19, its mechanism of transmission and preventative measures. Nonetheless, preventive behaviour was minimal. Therefore, all organisations involved in preventing and controlling COVID-19 should collaborate to enhance adherence to recommended preventive behaviours (Qanche et al., 2021).

Insights from The Pandemic

There are a number of implications resulting from the pandemic, including those that concern consumers, their perceptions of risk, their knowledge, food riders, and preventative measures such as:

Consumers:

The general public now understands that proper sanitation and food safety are essential. The pandemic highlighted the value of community-based food systems and the necessity of robust distribution networks. Due to social distance measures, online shopping and food delivery to the home have increased in popularity.

Perceptions of Risk/ Perceived Threats/Potential Dangers, and Risks:

Awareness of the dangers of zoonotic diseases and the necessity of a one health approach to preventing future pandemics have both been raised as a result of the current pandemic. The public and food system stakeholders' perception of risk has changed, calling for a more proactive approach to managing food crises.

Knowledge:

Because of the pandemic, it is more important than ever to ensure that those who work in the food industry receive ongoing training and education in food safety and hygiene. More study and dissemination of existing data on zoonotic diseases and their control is required.

Food Delivery/Food Rider/ Accompanied by A Meal:

The importance of food delivery workers and the need to protect their wellbeing during a pandemic has been brought to light. In order to protect food delivery riders and their customers, contactless delivery and Personal Protective Equipment (PPE) have become increasingly common.

Preventive Measures Taken by Members of The Food Supply Chain:

As a result of the pandemic, stricter regulations and guidelines for the food industry have been put in place to protect both workers and consumers. The need for risk management and emergency preparation to keep the food supply secure has been highlighted by the pandemic. The importance of coordination and open lines of communication between all participants in the food supply chain has grown in recent years.

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Conceptual Framework

Several theories, including the Risk Perception Attitude (RPA) framework, the Health Belief Model (HBM), and the Social Cognitive Theory (SCT), can be used to explain the food industry's response to the COVID-19 pandemic and the lessons it taught. Consumers' risk perceptions and attitudes towards food safety can be better understood with the help of these theories, which shed light on the importance of knowledge and education in bringing about behavioural change and the role of social and environmental factors in shaping behaviour and decision making. The food industry can use the framework to take a more preventative and proactive stance on food safety and resilience.

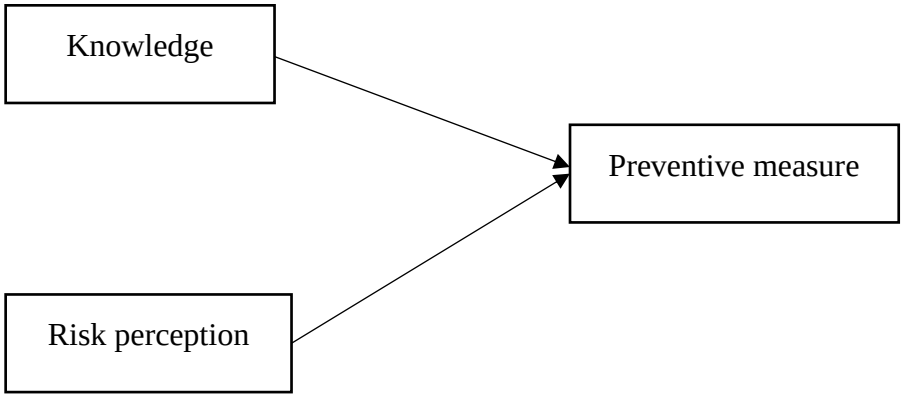

Figure 1: Conceptual Framework

The theoretical framework provides a path for understanding the complex interplay between knowledge, risk perception, and COVID-19 preventive measures, as well as insights into effective preventive action strategies as shown in figure 1. The knowledge, risk perception, and preventive measure conceptual framework for COVID-19 is predicated on the assumption that people's attitudes towards prevention are influenced by their level of knowledge and perception of risk. This, in turn, will have an effect on their actions in terms of taking the necessary precautions. Knowledge and risk perception will be hypothesised to be the primary drivers of preventative behaviour, with both being modifiable by a wide range of personal and environmental factors. Depending on the various theories that are presented, the names of the variables, such as Knowledge, risk perception, and preventive measure, are interchangeable

Conclusion and Future Research

The purpose of this conceptual paper was to determine the knowledge, risk perception and preventive actions among food workers, including food riders, during the COVID-19 pandemic. Policymakers may shape new regulations and guidelines for the food service industry in order to better implement preventative measures now and in the event of a future pandemic. This study has the potential to mitigate the negative effects of COVID-19 on the food industry, leading to improved food safety management systems and more efficient policies. During the unprecedented pandemic, there are still insufficient studies examining the knowledge of safety and the effect of preventive action as well as safety behaviour among food service personnel. Due to this scarcity, the originality of this study will generate new evidence or contribute to the development of a new body of food service areas.

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Notably, the results of this study will contribute directly to our understanding of the food worker's and food rider's safety behaviour in dealing with so-called the risk-taking situation or period. Additional research, including empirical and non-empirical studies, is required to uncover other issues related to knowledge, food safety, risk-taking, and preventive action. This research focuses on the social science research cluster of food safety (under the National Priority Area or NPA). In contrast, the international level aims to achieve the Sustainable Development Goals (SDG). The SDGs are the world's best plan for making the world a better place for people and the planet by 2030. The SDG is adopted by all Member States of the United Nations, which requiring action from all nations. Therefore, it is necessary to implement one of the Sustainable Development Goals (SDGs) plans under GOAL 3 - Ensure healthy lives and promote well-being for all at all ages, specifically under 3.D - Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

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